

CLAIM AMENDMENTS

1 through 4 (canceled)

1 5. (New) A method for producing a hydrocarbon mixture
2 rich in propylene, consisting essentially of propylene, ethylene
3 and other light hydrocarbons from a liquid charge stream containing
4 C₄ to C₈ olefins, which comprises the steps of:

5 (a) charging the liquid charge stream containing C₄ to C₈
6 hydrocarbons into an evaporator at a temperature of 25 to 200 ° C
7 to evaporate the liquid stream;

8 (b) superheating the evaporated liquid stream at a
9 temperature of 350 to 400 ° C followed by an additional
10 superheating of the evaporated liquid stream to 450 to 550 ° C
11 using hot water vapor; to form an olefin - water vapor mixture;

12 (c) adiabatically reacting the olefin-water vapor
13 mixture, superheated according to step (b), over a shape-
14 selective, pentasil zeolite fixed-bed catalyst to convert a
15 majority of the C₄ to C₈ olefins in the olefin-water vapor mixture
16 to a mixture of C₃ to C₆ olefins rich in propylene;

17 (d) following step (c), cooling the olefin-water vapor
18 mixture to a temperature of 100 to 200 ° C;

19 (e) quenching the olefin-water vapor mixture cooled
20 according to step (d), to a temperature of 40 to < 100 ° C, to
21 partially condense the olefin-water vapor mixture; thereby
22 obtaining a gaseous hydrocarbon phase consisting essentially of
23 ethylene, propylene, C₄ to C₈ olefins and additional hydrocarbons
24 and, a liquid phase consisting essentially of water that is
25 returned to the evaporated liquid stream during step (b);

26 (f) compressing the gaseous hydrocarbon phase obtained
27 according to step (e) at a pressure of 20 to 30 bar absolute to
28 remove accumulated water from the gaseous hydrocarbon phase to
29 obtain a mixture of gaseous and liquid hydrocarbon phases;

30 (g) separating the mixture of gaseous and liquid
31 hydrocarbon phases into a gaseous hydrocarbon phase, rich in
32 propylene, consisting essentially of propylene, ethylene, and other
33 light hydrocarbons, and recovering said gaseous hydrocarbon phase ,
34 and a liquid hydrocarbon phase containing C₄+ olefins; and

35 (h) separating the liquid hydrocarbon phase into a
36 fraction containing C₄ to C₆ olefins and a fraction containing C₇+
37 olefins.

1 6. (New) The method defined in claim 5, wherein according
2 to step (e) the liquid phase consisting essentially of water
3 accumulated as a condensate during the quenching is re-evaporated,
4 then heated to a temperature of 600 to 800 ° C, and then returned
5 to the liquid evaporated stream during step (b).

1 7. (New) The method defined in claim 5, wherein following
2 step (h) the majority of the generated C₄ to C₆ olefins is returned
3 to the liquid charge stream according to step (a).

1 8. (New) The method defined in claim 5, wherein
2 according to step (f) the accumulated water, separated from the
3 gaseous and liquid hydrocarbon phases is evaporated, then heated to
4 a temperature of 600 to 800° C, and returned to the liquid
5 evaporated stream during step (b).

1 9. (New) The method defined in claim 5 wherein according
2 to step (g) the gaseous hydrocarbon phase, rich in propylene
3 consists essentially of 75% propylene.